Prepared by Mohammad Umer

Python Tutorial

5.1 - LOOPS

Looping statements in python are used to execute a block of code repeatedly as long as a specified condition is true. These statements simplify repetitive tasks by reducing redundant code.

here,
loop execute a block repeatedly and `in keyword` is used to iterate over a sequence (like a list, tuple, string, or range).

`NOTE`

- `in` is a keyword when used as part of the syntax for control flow (for loops).
- `in` is an operator when performing membership testing i.e checking if a specific element exists in a collection such as a list, tuple, string, or set.

- There are primarily two types of loops in Python: `for loops` and `while loops`.

- for loop

It is used for iterating over a sequence (e.g., range, string, list, tuple etc.).

Syntax: `for variable in sequence:`

Q18. Write a Python program to display first 10 Whole Numbers using for loop.

In [1]:
```
for i in range(10):
    print(i)
```

```
0
1
2
3
4
5
6
7
8
9
```

Q19. Write a Python program to display first 10 Natural Numbers using for loop.

In [4]:
```
for i in range(1, 11):
    print(i, end=' ')
```

```
1 2 3 4 5 6 7 8 9 10
```

Q20. Write a Python program that takes a minimum and maximum number as input and prints all numbers in that range (inclusive).

`inclusive` means that the range includes both the starting number (minimum) and the ending number (max).

In [6]:
```
min = int(input("Enter minimum number"))
max = int(input("Enter maximum number"))

for i in range(min, max+1):
    print(i, end=' ')
```

```
14 15 16 17 18
```

Q21. Write a Python program to print all even numbers from 0 to 20.

In [12]:
```
for i in range(0, 20, 2):          # Start at 0, end at 21 (exclusive), step by 2
    print(i, end=' ')
```

```
0 2 4 6 8 10 12 14 16 18
```

Q22. Write a Python program to print numbers from 10 to 1 in reverse order.

In [13]:
```
for i in range(10, 0, -1):
    print(i, end=' ')
```

```
10 9 8 7 6 5 4 3 2 1
```

Q23. Write a Python program to find the sum of the first n natural numbers.

In [2]:
```
## Without using loop

n = int(input("Enter a number: "))
sum = (n * (n + 1)) // 2
print(f"The sum of the first {n} natural numbers is {sum}")
```

```
The sum of the first 10 natural numbers is 55
```

using loop

In [3]:
```
n = int(input("Enter a number: "))
sum = 0

for i in range(11):
    sum = sum + i

print(f"The sum of the first {n} natural numbers is {sum}")
```

```
The sum of the first 10 natural numbers is 55
```

Q24. Write a Python program to Display the Multiplication table of the number entered by the user.

In [1]:
```
n = int(input("Display Multiplicatin table of : "))

for i in range(1, 11):
    print(f"{n} x {i} = {n*i}")
```

```
5 x 1 = 5
5 x 2 = 10
5 x 3 = 15
5 x 4 = 20
5 x 5 = 25
5 x 6 = 30
5 x 7 = 35
5 x 8 = 40
5 x 9 = 45
5 x 10 = 50
```

Q25. Write a Python program to calculate the factorial of a number entered by the user.

In [14]:
```
num = int(input("Enter number: "))
fact = 1

for i in range(num, 0, -1):                # OR-   for i in range(1, num + 1):
    fact = fact * i

print(f"Factorial of {num} : {fact}")
```

```
Factorial of 5 : 120
```

Q26. Write a Python program to generate the Fibonacci series up to a given number of terms entered by the user.

In [ ]:
```
num = int(input("Enter the number of terms : "))
print(f"The Fibinacci series upto {num} is : ")

t1, t2 = 0, 1

for i in range(num):
    print(t1, end=' ')
    nt = t1 + t2
    t1 = t2
    t2 = nt
```

```
The Fibinacci series upto 8 is :
0 1 1 2 3 5 8 13
```

Q27. Write a Python program to print no.'s from 1 to N that are Even & divisible by 7.

In [3]:
```
N = int(input("Enter number : "))        # 100

for i in range(1, N):
    if i%2==0 and i%7==0:
        print(i, end=' ')
```

```
14 28 42 56 70 84 98
```

- OR -

In [4]:
```
N = int(input("Enter number : "))

for i in range(1, N):
    if i%2==0:
        if i%7==0:
            print(i, end=' ')
```

```
14 28 42 56 70 84 98
```

- OR -

In [8]:
```
N = int(input("Enter number : "))

for i in range(7, N, 7):
    if i%2==0:
        print(i, end=' ')
```

```
14 28 42 56 70 84 98
```

- while loop

A while loop is used to repeatedly execute a block of code as long as a given condition is True. It is ideal for situations where the number of iterations is not known in advance.

Syntax: `while condition:`

Feature	For Loop	While Loop
Usage	Iterates over a sequence or range.	Runs until a condition is False.
When to Use	When the number of iterations is known.	When the number of iterations is not known in advance.

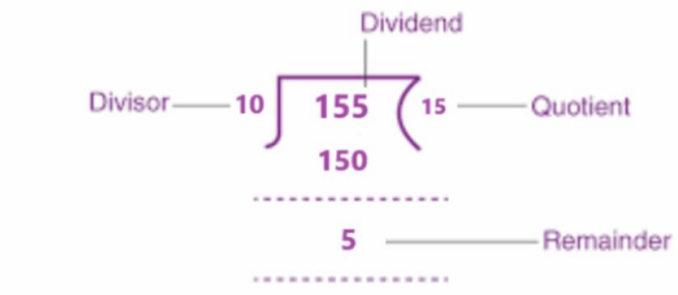
Example	`for i in range(1, 6):`
	`print(i)`
		`count = 1`
		`while count < 6:`
		`print(count)`
		`count += 1`

Q28. Write a Python program to calculate the number of digits present in a number entered by the user.

In [1]:
```
n = int(input("Enter the number : "))

temp = n
count = 0

while(n > 0):
    count += 1
    n = n // 10

print(f"The sum of Digits of {temp} is {count}")
```

```
The sum of Digits of 29 is 2
```

Q29. Write a Python program to calculate the sum of the digits of a number entered by the user.



In [ ]:
```
n = int(input("Enter the number : "))

temp = n
sum = 0

while(n > 0):
    r = n % 10      # Remainder
    sum += r
    n = n // 10      # Quotient

print(f"The sum of Digits of {temp} is {sum}")
```

```
The sum of Digits of 155 is 11
```

Q30. WAP to find numbers between 1 & n whose digit sum is equal to k.

In [11]:
```
n = int(input("Enter number : "))                  # 60
k = int(input("Enter the value of k : "))          # 4

for i in range(1, n):
    sum = 0
    temp = i                # important step

    while(temp>0):
        r = temp%10
        sum += r
        temp = temp // 10

    if sum == k:
        print(i, end=' ')
```

```
4 13 22 31 40
```

Q31. WAP to take N integers as input and display only those integers whose digit sum is less than a given threshold k.

In [5]:
```
N = int(input("Enter the number of integers: "))
k = int(input("Enter the threshold value k: "))

print("Enter the integers:")
for i in range(N):
    num = int(input())
    digit_sum = 0
    temp = num                                  # OR

    while(temp>0):                              #   digit_sum = sum(int(digit) for digit in
        r = temp%10
        digit_sum += r
        temp = temp // 10                       #

    if digit_sum < k:
        print(num, end=" ")
```

```
Enter the integers:
2 14
```

Q32. Write a Python program to reverse the digits of a number entered by the user.

In [2]:
```
n = int(input("Enter the number : "))

temp = n
reverse = 0

while(n > 0):
    r = n % 10                  # Remainder
    reverse = reverse * 10 + r
    n = n // 10                 # Quotient

print(f"The reverse of Digits {temp} is {reverse}")
```

```
The reverse of Digits 123 is 321
```

Q33. Write a program to check whether the number is a palindrome or not.

In [ ]:
```
n = int(input("Enter an integer: "))
original_num = n
rev_num = 0

while n > 0:
    last_digit = n % 10                      # Remainder    -  Extract the last digit
    reverse = reverse * 10 + last_digit
    n = n // 10                              # Quotient     -  Remove the last digit


if (rev_num == original_num):
    print(f"{original_num} is a palindrome.")
else:
    print(f"{original_num} is not a palindrome.")
```

```
121 is a palindrome.
```